

# Request for Economic Stimulus Funds

## Concept Proposal

*Submitters (Name of Workgroup & Chair/Co-Chairs):*

Kentucky Space

*Project Title:* **Kentucky Space: Enhancing Space Related Infrastructure**

*Project Partners (Known or Anticipated):*

The Kentucky Space consortium currently includes:

- The Kentucky Science and Technology Corporation
- Kentucky IHEs:
  - The University of Kentucky
  - University of Louisville
  - Morehead State University
  - Western Kentucky University
  - Murray State
  - KCTCS
- External Partners:
  - Stanford
  - UC Berkeley
  - Applied Physics Laboratory at Johns Hopkins University
  - NASA
- Commercial ventures:
  - Belcan
- New public and private universities in Kentucky

*Project Background & Purpose (Justification for Project):*

The U.S. space economy was one of the few sectors of the U.S. economy that exhibited positive growth in 2008. Aerospace accounts for 15% of the U.S. GDP and ranks second in U.S. exports of manufactured goods (which in total account for 62% of U.S. exports). Even during the economic recession of 2008, the U.S. space economy grew at an astounding 6%. The job market is robust for graduates in this field. The current workforce is “graying” and an inadequate replacement workforce is being produced by U.S. institutes of higher education.

As the United States moves into the next 50 years of space flight, Kentucky is poised to launch its first orbital satellite and to prepare the next generation of aerospace engineers and scientists. On-going space research activities are firmly establishing a competitive space program in Kentucky by developing the infrastructure and expertise needed to sustain a program that will be mutually beneficial to NASA and promote high tech jobs and economic development in the Commonwealth.

Kentucky Space is a collaborative effort of public and private partners throughout the state of Kentucky focused on small satellite development and access to space for small payloads. Kentucky Space consortium was formed under the leadership of the Kentucky Science and Technology Corporation (KSTC) a private nonprofit corporation committed to the advancement of science, technology and innovative economic development in Kentucky.

Since its inception in March 2006, Kentucky Space has moved from an initial concept to two sub-orbital space missions and an edge of space high altitude balloon mission (with more to follow). In 2010 Kentucky Space will launch its first orbital satellite, KySat-1 based on a modular reusable bus developed in Kentucky by Kentucky students and faculty. KySat-1 will fly on a major NASA mission having been down-selected for launch by NASA by a competitive process.

*Project Description (General Goals & Implementation Strategies):*

The Kentucky Space program has three primary goals: 1.) to promote economic development in the Commonwealth by establishing a commercial cottage space industry, 2.) to develop a pipeline of students that matriculate from pre-college to college to graduate programs to the workforce in high tech disciplines, and 3.) to establish both physical and human infrastructure (R&D talent) to support these goals.

Specifically, this project will provide the infrastructure and capacity for faculty and students to design, develop, and test both nano- and micro-sat satellite buses and subsystems and associated microelectronics and MEMs devices and to provide commercial space mission support services (telemetry, tracking, and control) via a network of Earth stations established at various geographic locations throughout the state. Additionally, these enhancements will allow the Kentucky Space Consortium to design, develop, and test scientific payloads for small satellites to support research in Earth remote sensing, astrophysics, space physics, energy, microbiology and microfluidics.

*Project Team (Project Manager(s), Content Experts, Instructional Designers, etc.):*

Project Managers, Kris Kimel, President, Kentucky Science and Technology Corporation; Dr. Mahendra Jain, Executive Director, Kentucky Science and Engineering Foundation, Dr. James Lumpp, University of Kentucky and Dr. Ben Malphrus, Morehead State University.

Project Team includes Science and Engineering Staff from:

- University of Louisville
- University of Kentucky

- Morehead State University
- Western Kentucky University
- Murray State University
- Northern Kentucky University
- Eastern Kentucky University
- Kentucky State University
- Kentucky Community and Technical College System
- Belcan Corporation (provider of engineering services to aerospace and defense sectors)

*Project Budget & Amount of Economic Stimulus Funds Requested:*

The project proposes to increase infrastructure at each of the universities. A budget overview is provided below:

- Addition of IHEs in Kentucky new to the Consortium:
  - Year One  
\$35,000 per year x 2 = \$70,000
  - Year Two  
\$35,000 per year x 5 = \$175,000

Subtotal: \$245,000
- Enhance satellite development, testing and orbital flight capabilities specific to each university working to the strengths of each institution.
  - Enhance mechanical fabrication capabilities at UL \$300,000
  - Bus development and testing at UK (electronic test equipment, zero gauss chamber, Helmholtz coil, thermal vacuum chamber, thermal cycle chamber, vibration test equipment, solar cell test capability, power test equipment, electronic assembly) \$500,000
  - Communications facilities at Morehead, etc. (enhanced anechoic chamber) \$400,000
  - Testing facilities to serve as an Eastern testing facility for cubesats and small satellites. \$300,000
- UHF/VHF Ground stations at each of the member institutions:  
\$20,000 x 5 = \$100,000
- Expand technical staff for the Kentucky Space Program: \$155,000

Total Budget for two year period: \$2,000,000.00